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What Affects Resistance?

Materials:

For each group:

- Battery or series of batteries with enough voltage to light the bulb.
- Bulb
- Bulb base
- Wires with alligator clips
- A variety of wires:
  - Suggested:
    - 3 wires that are the same length and gauge but made of different materials.
    - 3 wires that are the same length and material but different gauges.
    - 3 wires that are the same gauge and material but different lengths.

Important Note:

If you do not have a bulb base use an alligator clip to clip the side of the bulb then touch the bottom of the bulb to the wire to make the connection.

Pre-lab Discussion:

1. Observe a brightly lit bulb and a dimly lit bulb. Look at the set up of the circuit, what do you notice is different between the two circuits?

Activity:

1. As you explore what may cause a difference in the brightness of the two bulbs, change only one factor at a time. That will make it easier to identify what is causing the change. What factor will you change and why? **Look at the materials listed above to get an idea of what you could test.**

2. How will you collect your data? (use a table, make a graph etc) Record your data below.

3. Did the above variable affect the brightness at which the bulb burned?

4. Try testing another variable. Record your data below.

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5.Did the variable in #5 affect the brightness at which the bulb burned?

6. Try testing another variable. Record your data below.

7.Did the variable in #6 affect the brightness at which the bulb burned?

Post-Lab Discussion:

1. Why do the you think that longer wires give dimmer bulbs than shorter wires?

2. What evidence might support their conclusions.

3. Recall the information that different types of atoms/materials have different abilities to conduct electricity, what factors they thought might have affected the resistance in those materials.

4. Were you surprised to see that larger diameter wire had a brighter bulb than the smaller diameter wire. In terms of resistance and the ability for electrons to flow, why might this be true? (Feel free to compare this to the water analogy, connect the resistance to the flow of water through different sized hoses to the flow of electrons in different sized wires)